Supporting Information

Two-Photon-Induced Charge-Variable Conjugated Polyelectrolyte Brushes for Effective Gene Silencing

Hui Zhao,† Haojie Tao,† Wenbo Hu,‡ Xiaofei Miao,† Yufu Tang,† Tingchao He,§ Junzi Li,§ Qi Wang,‡ Lihong Guo,‡ Xiaomei Lu,‡ Wei Huang,‡II and Quli Fan,†*

[†]Key Laboratory for Organic Electronics and Information Displays & Institute of Advanced Materials (IAM), Jiangsu National Synergetic Innovation Center for Advanced Materials (SICAM), Nanjing University of Posts & Telecommunications, 9 Wenyuan Road, Nanjing 210023, China.

‡Key Laboratory of Flexible Electronics (KLOFE) & Institute of Advanced Materials (IAM), Jiangsu National Synergetic Innovation Center for Advanced Materials (SICAM), Nanjing Tech University (NanjingTech), 30 South Puzhu Road, Nanjing 211816, China.

§Key Laboratory of Optoelectronic Devices and Systems of Ministry of Education and Guangdong Province, College of Physics Science & Technology, Shenzhen University, Shenzhen 518060, China

Shaanxi Institute of Flexible Electronics (SIFE), Northwestern Polytechnical

University (NPU), Xi'an 710072, China.

Corresponding Author

*E-mail: iamqlfan@njupt.edu.cn



Scheme S1. Synthesis route of photo-induced charge-variable cationic conjugated polyelectrolyte brush (PPENBr-ONB) and their photolytic process.



Figure S1. The ¹H NMR of 4,5-dimethoxy-2-nitrobenzyl 2-bromoacetate in CDCl₃.



Figure S2. The ¹³C NMR of 4,5-dimethoxy-2-nitrobenzyl 2-bromoacetate in CDCl₃.



Figure S3. The ¹H NMR of PPEN in CDCl₃.



Figure S4. The ¹H NMR of PPENBr-ONB in D₂O.



Figure S5. The FTIR of PPEN and PPENBr-ONB.



Figure S6. Stability of PPENBr-ONB/siRNA (mole ratio in 1 : 10) complexes. PPENBr-ONB protected siRNA from degradation by nuclease. Lane 1, 4 μM siRNA only; Lane 2, 4 μM siRNA treated with 7.3 μM RNase; Lane 3, PPENBr-ONB/siRNA complexes treated without RNase; Lane 4, PPENBr-ONB/siRNA complexes treated with 7.3 μM RNase.



Figure S7. Two-photon fluorescence spectra of PPEN in THF.



Figure S8. Two-photon fluorescence spectra of PPENBr-ONB before and after 720 nm irradiation for 1 h

This result showed that the fluorescence of PPENBr-ONB increased obviously after 720 nm irradiation for 1 h, which was mainly due to the photodegradation of ONB. This phenomenon further demonstrate the FRET between PPEN and ONB.



Figure S9. In vitro cell viability of Hela cells incubated with PPENBr-ONB with different concentrations





Figure S10. In vitro cell viability of Hela cells incubated with PPENBr-ONB/siRNA complex for 48 h at 37

°C (mole ratios from 1 : 0 to 1 : 10).